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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,774	03/15/2004	Tadashi Noguchi	249601US2TTC	8631

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ALEXANDRIA, VA 22314

EXAMINER

YUN, JURIE

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 06/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/799,774

Applicant(s)

NOGUCHI, TADASHI

Examiner

Jurie Yun

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AM

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/15/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-21 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for laser beams, does not reasonably provide enablement for other beam generators such as electrons or ultrasound. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. This rejection can be overcome by reciting "a laser beam generator".

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4 and 10-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steinberg (USPN 6,795,523 B2) in view of Bernardi (USPN 4,891,833).
5. With respect to claims 1, 14, 19, and 21, Steinberg discloses a radiotherapy apparatus (Fig. 1) and method for radiating an X-ray and concentrating the X-ray towards a predetermined part of an object, the apparatus comprising: an X-ray radiator

(column 5, line 11) configured to radiate the X-ray; and a collimator (Fig. 4) configured to control a radiation field of the X-ray radiated by the X-ray radiator, including: a first plurality of collimating leaves (100a) and a second plurality of collimating leaves (100b) opposing the first plurality of collimating leaves. Steinberg discloses a pre-planning system is typically used to define and simulate a beam shape required to deliver an appropriate radiation dose to the treatment zone and that the data is stored in mass storage device 46 for use by computer 40 in delivering treatment (column 4, lines 53-58). Steinberg also discloses each of the plurality of collimating leaves is independently controllable (column 6, lines 25-42).

Steinberg does not disclose a beam generator configured to generate a beam which emanates between the first and second plurality of collimating leaves; a detector configured to detect the beam; a memory configured to store position information of each leaf of the first and second plurality of collimating leaves when said each leaf is determined to intersect the beam based on the detection; and a controller configured to position said each leaf based on the position information to control the radiation field.

Bernardi discloses a beam generator (Fig. 10, 200) configured to generate a beam (201) which emanates between first and second collimating leaves (40 & 42); a detector (26) configured to detect the beam; and a controller configured to position said each leaf based on the position information to control the radiation field (column 4, lines 55-62). Bernardi also discloses the beam intersects an axis of the X-ray (34). Bernardi does not disclose a memory configured to store position information of each leaf, but it would be capable of doing this by means of the CAT scan system's central data

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acquisition system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the beam generator disclosed by Bernardi in the Steinberg collimating apparatus, and to use the mass storage device to store position information of each leaf of the first and second plurality of collimating leaves when said each leaf is determined to intersect the beam based on the detection, to find the optimal positioning of the plurality of collimating leaves which would reduce unnecessary radiation to the patient.

6. With respect to claims 10-13 and 20, Steinberg in view of Bernardi disclose all of the elements as seen above, but do not disclose a second beam, or third and fourth beams. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use second, third, and fourth beams, as this would shorten positioning time by enabling simultaneous positioning of the first and second plurality of collimating leaves. It also would have been obvious to one of ordinary skill in the art to use a first group of beams including the first beam and a second group of beams including the second beam as the plurality of beams, because the more beams used, the quicker the positioning time.

7. With respect to claims 2 and 3, Bernardi discloses a reflector (204 – “45 degree mirror”) configured to reflect the beam generated by the beam generator so that the reflected beam emanates between the first and second plurality of collimating leaves, and is detected by the detector (26). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use this teaching and incorporate a

reflector in the Steinberg apparatus, to accurately position the beam to simulate the X-ray irradiation zone, resulting in better collimation.

8. With respect to claim 4, Steinberg in view of Bernardi do not disclose the memory stores the position information when the detector detects a predetermined percentage of the beam, but it would have been obvious to one of ordinary skill in the art at the time the invention was made to do this, to make the system more flexible for different needs.

9. With respect to claim 15, Steinberg discloses a display (42) configured to display information of the collimator.

10. With respect to claims 16-18, Steinberg in view of Bernardi do not disclose the beam generator is rendered operative when the apparatus is powered, or at predetermined intervals, or in response to instruction from an input unit. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate all of these methods for rendering the beam generator operative, to make the system more flexible to accommodate different situations.

11. Claims 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steinberg (USPN 6,795,523 B2) in view of Bernardi (USPN 4,891,833) as applied to claim 1 above, and further in view of Heflin (USPN 4,628,523).

12. With respect to claims 5-9, Steinberg and Bernardi do not disclose a compensation unit configured to compensate the position information, wherein the controller positions said each leaf based on the compensated position information, and wherein the compensation unit compensates the position information in accordance with

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an incident angle of the beam between the first and second plurality of collimating leaves, and wherein the memory is further configured to store the compensated position information. Heflin discloses means for compensating for varying displacement (column 4, lines 13+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teaching of Helfin in the Steinberg/Bernardi system, to make the positioning of the collimator leaves accurate. It would have been obvious to one of ordinary skill in the art also to store this information in the memory, along with the position information, for use together, to make useful the information thus resulting in better collimation.

Heflin discloses compensation distance information is based on a distance caused by a gear engagement in a gear rotation when the collimator is driven by a gear (column 4, lines 13+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to store this information in a second memory configured to store compensation distance information, to compensate the positioning of the leaves, resulting in better collimation. It also would have been obvious to one of ordinary skill in the art to have the first distance information used when each leaf is driven to move by a first predetermined distance in a first direction, and the second distance information is used when each leaf is driven to move by a second predetermined distance in a second direction, to account for varying directions of each leaf which would have different compensation distances, making the compensation unit more accurate.

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Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hughes (USPN 6,600,810 B1) discloses a multiple layer multileaf collimator design to improve resolution and reduce leakage.

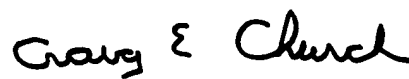
14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 571 272-2497. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jurie Yun
June 17, 2005



Craig E. Church
Primary Examiner